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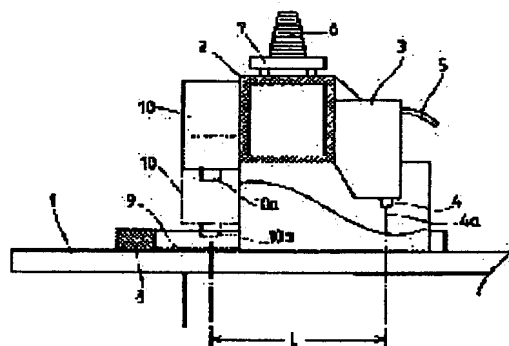
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(54) EMBROIDERY MACHINE EQUIPPED WITH PRINTER

(57)Abstract:

PURPOSE: To obtain an embroidery machine equipped with a printer capable of not only extremely simply changing operations without requiring much labor and time but also selectively operating embroidering of cloth, printing of the cloth itself with ink in a desired color and printing of embroidery yarn sewed to the cloth with ink.

CONSTITUTION: The embroidery machine consists of a mechanism of sewing machine to form desired stitches by reciprocating a needleshaft 4 attached to a sewing needle 4a against cloth 9, a frame driving mechanism to move and embroidering frame 8 to support the cloth 9 in an extended state in a direction to intersect the needleshaft 4 at right angles and a printer having an ink head 10 to jet an ink toward the cloth 9.



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CLAIMS

[Claim(s)]

[Claim 1] The sewing-machine device which forms a necessary seam by making the needle bar (4) equipped with a sewing needle (4a) reciprocate to cloth (9), An embroidery machine equipped with the printing equipment characterized by constituting from a frame drive made to move the embroidery frame (8) which supports said cloth (9) in the state of spreading in the direction which intersects perpendicularly with said needle bar (4), and a printing equipment which has the ink head (10) which injects ink towards said cloth (9).

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the embroidery machine concerning the new design which also made it possible to give the ink print of a desired color in more detail about an embroidery machine equipped with a printing equipment to the embroidery thread it not only can embroider, but sewn on the cloth itself or this cloth to cloth.

[0002]

[Description of the Prior Art] Having the both sides of an embroidery function and the print function like the above, the embroidery machine which realized using each function selectively according to liking of a user does not exist at all in the past.

[0003]

[Problem(s) to be Solved by the Invention] In a dress-and-ornaments-related field, if it embroiders [the / print / a part of] further while giving a print shank to cloth, it is clear that fanciness increases further. Then, after using a printing machine etc. first and printing a necessary print shank on cloth as an approach of manufacturing such enrichment, the cloth with which this print was given is set to an embroidery frame, and it is possible to embroider with a well-known embroidery machine. However, when adopting such an approach, it is difficult to carry out alignment of the embroidery shank to accuracy to the print shank on which it was already printed. for this reason, gap is occasionally looked like [the shank location of a print shank and an embroidery shank], is carried out to it, it is generated in it, and there is a serious problem that the appearance and quality as goods fall off.

[0004] Moreover, as an embroidery machine, the so-called embroidery machine of a multi-needle type is put in practical use suitably widely. While this embroidery machine has equipped the sewing-machine head with the needle bar of a large number which equipped the soffit section with each sewing needle selectable, it lets the yarn of a color which is different in each sewing needle pass. And although a multicolor shank can be easily embroidered by making suitably a selection change of the needle bar which should be used, in order to take necessary time and effort to perform a through substitute of the yarn which each sewing needle let pass, it also has the trouble that housekeeping takes time amount.

[0005]

[Objects of the Invention] Very easy change-over actuation is only performed, and it aims at offering a means to by_ which the embroidery to cloth, the ink print of the color of the request to the cloth itself, and the ink print to the embroidery thread sewn on this cloth can be given selectively, without proposing this invention in view of the aforementioned technical problem inherent in a common embroidery machine, so that it may solve this suitably, and requiring much time and effort and time amount.

[0006]

[Means for Solving the Problem] In order to conquer said technical problem and to attain the desired end, an embroidery machine equipped with the printing equipment concerning this invention The sewing-machine device which forms a necessary seam by making the needle bar equipped with a sewing needle reciprocate to cloth, It is characterized by constituting from a frame drive made to move the

embroidery frame which supports said cloth in the state of spreading in the direction which intersects perpendicularly with said needle bar, and a printing equipment which has the ink head which injects ink towards said cloth.

[0007]

[Function] It becomes possible to do an embroidery activity and a print activity simply, without recovering cloth, since the sewing-machine device and the printing equipment are put side by side.

[0008]

[Example] Next, about an embroidery machine equipped with the printing equipment concerning this invention, a suitable example is given, and it explains below, referring to an accompanying drawing.

Drawing 1 - drawing 7 show the 1st example which applied this invention to the lock stitch embroidery machine of one-stitch many head forms.

[0009] In drawing 1 - drawing 5, a sign 1 shows a level sewing-machine table, and sequential immobilization is carried out at spacing with a total of three proper sewing-machine heads 3 in the front face of the sewing-machine frame 2 arranged horizontally above this sewing-machine table 1. These sewing-machine heads 3 are equipped with the needle bar 4 which sewed to the soffit and equipped with needle 4a, the balance 5, the cloth presser foot (not shown), etc. according to the individual. And on the underside of this table 1, a necessary lock stitch can be performed now to the bottom of a collaboration operation with the iron pot which was arranged corresponding to each sewing-machine head 3 and which is not illustrated.

[0010] The yarn die 6 which supplies a needle thread to the top face of the sewing-machine frame 2 at sewing needle 4a of each sewing-machine head 3 is stood to ***** 7 corresponding to each sewing-machine head 3. And the needle thread which it let out from each yarn die 6 is sewn via the tension thread guard and many members of balance 5 grade which are not illustrated, and needle 4a lets it pass.

[0011] The embroidery frame 8 held where the cloth 9 as the ornamented body is spread is laid in the top face of the sewing-machine table 1 free [migration in the direction of X-Y], this embroidery frame 8 is driven with the frame drive which operates based on the X-Y data about an embroidery shank and a print shank, and migration in said direction of X-Y is made. This frame drive has the well-known configuration which consists of the pulse motor for X actuation installed in the underside of the sewing-machine table 1, a pulse motor for Y actuation, and a transfer device in which change a revolution of each motor into rectilinear motion, and driving force is transmitted to an embroidery frame 8.

[0012] Moreover, in the rear face of said sewing-machine frame 2, rise-and-fall actuation with the lifting device with which the ink head 10 does not illustrate a mounting eclipse and this head 10 in each sewing-machine head 3 and the location which corresponds, respectively is possible. Each ink head 10 is equipped with red, blue, and the ink cartridge filled up with the ink of each color which constitutes yellow three primary colors exchangeable, and it has come to spurt [each] out from nozzle 10a of a soffit towards one point of a lower part through the built-in ink jet device according to an input signal. That is, the printing equipment in this example is constituted by said ink head 10, an embroidery frame 8, the frame drive, etc.

[0013]

[An operation of the 1st example] Next, the case where the shank shown in drawing 6 is created about an operation of an embroidery machine equipped with the printing equipment concerning this example is mentioned as an example, and is explained. The shank shown in drawing 6 shall consist of embroidery parts 6a, 6b, 6c, and 6d, and each embroidery parts 6a-6d shall be expressed by color different, respectively. As a creation procedure of such a shank, each embroidery parts 6a-6d are first embroidered with the white needle thread as an example by the sewing-machine head 3. And after embroidery is completed, from said ink head 10, it spurts [of a color different, respectively] out into each embroidery parts 6a-6d, and stains.

[0014] That is, in order to perform each embroidery parts [6a-6d] embroidery, in advance of a startup of a sewing machine, the embroidery data corresponding to the above-mentioned shank are inputted into an embroidery machine at a built-in computer. Drawing 7 (a) is the enlarged drawing of embroidery partial 6a, and shows the stitch condition to a detail. Here, the X-Y data aggregate showing the

movement magnitude of the embroidery frame 8 required to form each stitch is used as embroidery data. while the sign S1 shown in drawing 7 (a) and drawing 6 shows the embroidery start point of embroidery partial 6a and embroidery is started from this S1 -- final -- this -- embroidery is completed by S1. S2 similarly shown in drawing 6 - S4 show each embroidery parts [6b-6d] embroidery start point. The each embroidery parts [6a-6d] embroidery data aggregate serves as embroidery data of the whole shank shown in drawing 6 , and each embroidery start point S1 - S4 are specified on the basis of the predetermined reference point S0 shown in drawing 6 .

[0015] After inputting embroidery data like the above, an embroidery frame 8 is moved and the request location of cloth 9 is doubled with sewing needle 4a of a needle bar 4. And if starting of a sewing machine is started, when an embroidery frame 8 moves, sewing needle 4a will move to the location of S1 from the location of S0 relatively, and embroidery will be started by after an appropriate time. In this way, after the embroidery of embroidery partial 6a is completed, an embroidery frame 8 moves, sewing needle 4a moves to S2 relatively, and embroidery of embroidery partial 6b is performed. Henceforth, embroidery parts [6c and 6d] embroidery is performed similarly, after the embroidery which is 6d is completed, it sews, and needle 4a returns to S0. Then, as an embroidery frame 8 shows drawing 5 , when only the distance L of sewing needle 4a and nozzle 10a of the ink head 10 carries out offset migration to back, nozzle 10a of the ink head 10 agrees above S0. Then, as shown in drawing 5 , it is dropped from a continuous-line location to a fictitious-outline location by the lifting device which the ink head 10 does not illustrate, and nozzle 10a counters right above [of cloth 9]. While an embroidery frame 8 drives after that based on the embroidery data used at the time of the above-mentioned embroidery, as ink is spouted and it is shown in drawing 7 (b) from nozzle 10a of the ink head 10, ink is sent out one by one by the white yarn which forms each stitch.

[0016] the setting-out data with which the color of the ink which each embroidery parts 6a-6d are stained in the same order as the time of embroidery, and is spouted from nozzle 10a since said embroidery data are used as it is was beforehand set to actuation of an embroidery frame 8 -- following - - each embroidery part 6 -- it is switched every a-6d. By passing through the above-mentioned process, from the beginning, each embroidery parts 6a-6d present the appearance of whether to have been embroidered with a colored yarn different, respectively, and are finished.

[0017] Next, based on drawing 8 - drawing 11, the 2nd example of an embroidery machine equipped with the printing equipment concerning this invention is explained. In addition, about the same configuration member as said 1st example, the same sign is attached and detail explanation is omitted. In drawing 8 and drawing 9 , the sewing-machine head 53 of a total of three multi-needle types holds proper spacing in the front face of the sewing-machine frame 2, and is arranged in it. Each sewing-machine head 53 is equipped with the needle bar 4 and the balance 5 four [at a time] in response, respectively, and a desired needle bar 4 and a desired balance 5 drive alternatively by carrying out slide actuation of the part which supported these to a longitudinal direction.

[0018] A total of four yarn dies 56 with which colors differ corresponding to each sewing-machine head 53 are stood to ***** 7 on the sewing-machine frame 2, respectively, and sewing needle 4a of a needle bar 4 lets the yarn sent out from each yarn die pass via each balance 5. Moreover, each sewing-machine head 53 and the ink head 10 which equips a corresponding location with the same configuration as the 1st example are arranged in the rear face of the sewing-machine frame 2, respectively.

[0019]

[An operation of the 2nd example] Next, the case where the shank shown in drawing 10 is created about an operation of this example is mentioned as an example, and is explained. The shank shown in drawing 10 embroiders embroidery partial 10b by the sewing-machine head 53, after the perimeter consists of embroidery partial 10b which consists of an alphabetic character of print shank 10a which makes an ellipse form and "V", "S", and "O" and prints print shank 10a by the ink head 10 first. That is, the color image data which scanned the subject copy of one line of a shank at a time for every predetermined pitch of x directions in the direction of y with the image scanner etc., and was obtained as data for printing print shank 10a is used. And it is made for the location data of the shank on the basis of the

predetermined origin/datum S0 to be included in this data. Moreover, embroidery partial 10b shall embroider each part of "V", "S", and "O" with a colored yarn different, respectively, and specifies the location of the embroidery start point S1 on the basis of said reference point S0.

[0020] And if an embroidery frame 8 is moved, nozzle 10a of the ink head 10 is doubled with the request location of cloth 9 and a sewing machine is started after inputting said each data, it will descend like the case where the ink head 10 is said 1st example. Subsequently, while an embroidery frame 8 repeats the reciprocation per line of x directions in the direction of y, according to the chrominance signal of each position coordinate, ink is spouted from nozzle 10a of the ink head 10, and desired print shank 10a is printed on cloth 9.

[0021] After the print of print shank 10a is completed, an embroidery frame 8 moves and nozzle 10a of the ink head 10 returns to S0 point. Then, when an embroidery frame 8 moves only the distance L of nozzle 10a and sewing needle 4a (refer to drawing 5) to the front like said 1st example, sewing needle 4a of the needle bar 4 in an activation point agrees in S0 point. Although the sewing needle 4a moves to the embroidery start point S1 and moves to the embroidery process of embroidery partial 10b after an appropriate time, "V", "S", and "O" are embroidered with the colored yarn as setting out, respectively by choosing the needle bar 4 by which selection setting out was beforehand carried out to each of the "V", "S", and "O" for each part. Print shank 10a and embroidery partial 10b do not cause a disagreement to a location mutual [these], and the combination shank as data is suitably created by said a series of operations.

[0022] In addition, in this example, it is also possible to let white yarn pass about one in four sewing needle 4a of each sewing-machine head 53, to embroider all embroidery partial 10b only with white yarn, after said print process is completed, and to stain with the ink head 10 like the 1st example to the embroidery part further.

[0023] In said 1st and 2nd examples, although the sewing machine of a lock stitch form was mentioned as the example as an example of a sewing machine, you may be the chain stitch sewing machine which forms the so-called chain stitch and the so-called loop stitch with one yarn. Moreover, although it had the configuration which arranged the sewing-machine head 10 in the backside [the sewing-machine frame 2] in each example, of course, you may make it arrange next to each sewing-machine head 3 (53) at the front-face side of the sewing-machine frame 2.

[0024]

[Effect of the Invention] As explained above, since an embroidery machine equipped with the printing equipment concerning this invention can do an embroidery activity and a print activity only by easy actuation, without re-covering cloth, it can create at accuracy the combination shank which consists of a print and embroidery as shank data, without a shank location mutual [these] being out of order.

Moreover, after embroidering with the yarn of single colors, such as white, they do so also staining a request to the already embroidered yarn with a printing equipment, and the useful effectiveness of being able to embroider a multicolor shank in false, even if it does not use the so-called multi-needle type sewing-machine head, since it is possible collectively.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the top view of the 1st example of this invention.

[Drawing 2] It is the front view of the 1st example of this invention.

[Drawing 3] It is the rear view of the 1st example of this invention.

[Drawing 4] a part of left lateral of the 1st example of this invention -- it is fracture drawing.

[Drawing 5] a part of drawing 4 -- it is an enlarged drawing.

[Drawing 6] It is an explanatory view for explaining an operation of the 1st example of this invention.

[Drawing 7] a part of drawing 6 -- it is an enlarged drawing.

[Drawing 8] It is the top view of the 2nd example of this invention.

[Drawing 9] It is the front view of the 2nd example of this invention.

[Drawing 10] It is an explanatory view for explaining an operation of the 2nd example of this invention.

[Description of Notations]

3 (53) Sewing-machine head

4 Needle Bar

4a Sewing needle

8 Embroidery Frame

9 Cloth

10 Ink Head

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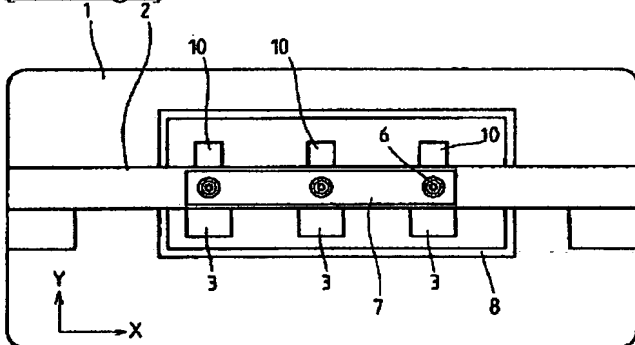
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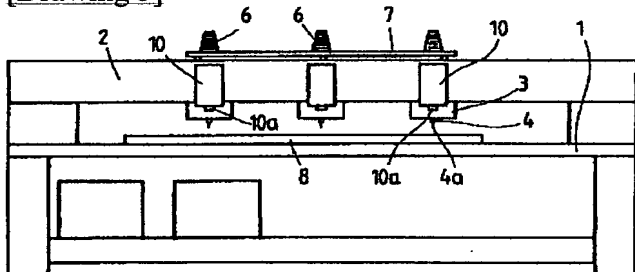
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DRAWINGS

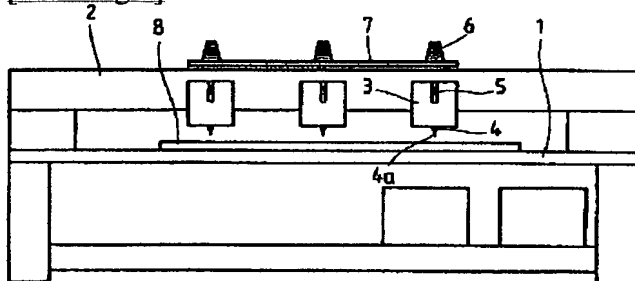
[Drawing 1]



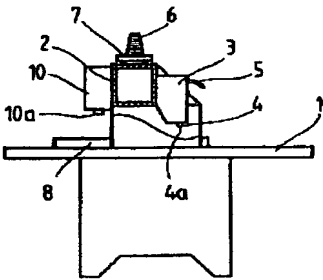
[Drawing 3]



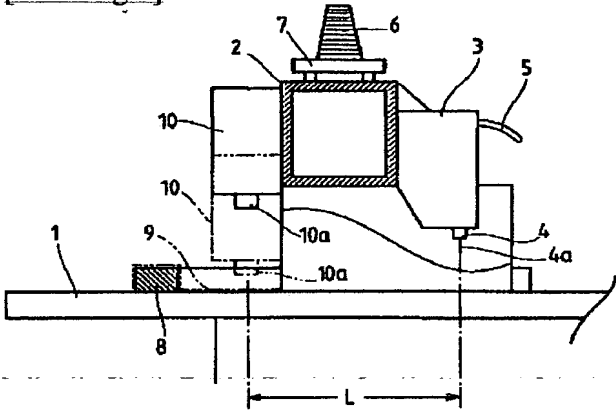
[Drawing 2]



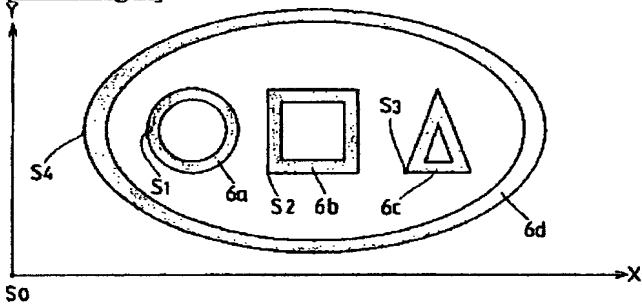
[Drawing 4]



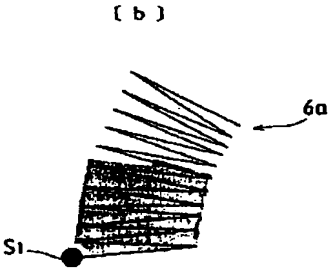
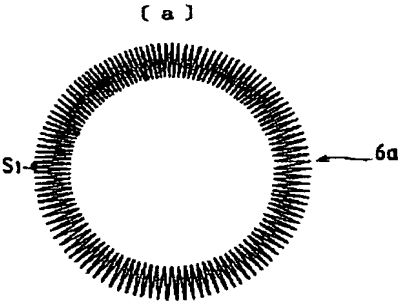
[Drawing 5]



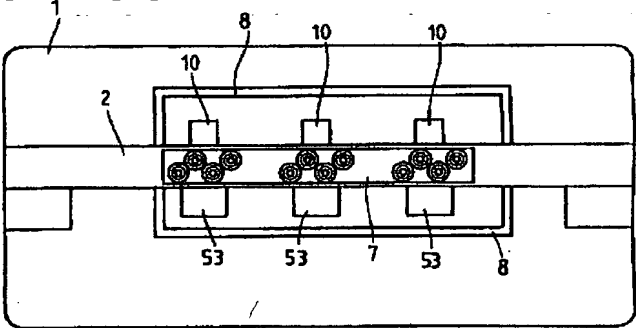
[Drawing 6]



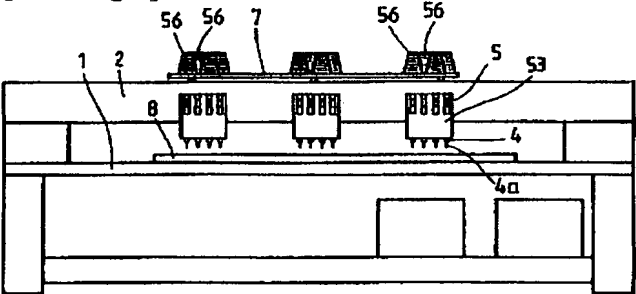
[Drawing 7]



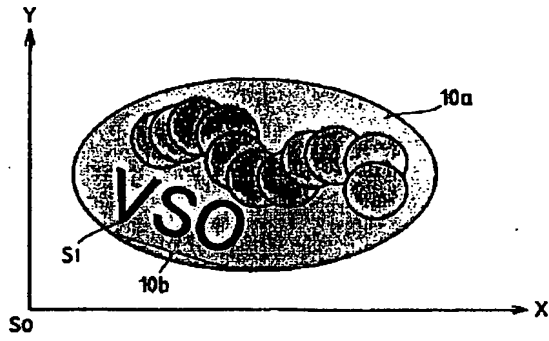
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]